REMARKS

In an Office Action mailed September 6, 2000, Claims 1-187 were rejected under 37 C.F.R. § 1.75(b) and M.P.E.P. 2173.05(n) as being unduly multiplied. Applicant was required to limit the total claims of this application to 125 with 25 being independent. Without acceding to the basis of the multiplicity rejection, Applicant filed an Amendment on October 6, 2000 reducing the total number of claims and reducing the number of independent claims. This application now contains Claims 1-39, 41-43, 45, 48-55, 68-70, 72-74, 76, 79-84, 96-99, 101-103, 105, 108-115, 128-149, 156-163, 168-171, and 179-187, which are presented for examination. See the status information on page 13 of the Amendment of May 22, 2000.

The Commissioner is hereby authorized to charge to Deposit Account No. 22-0585 any fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and

has not been requested separately, such extension is hereby requested.

Respectfully submitted,

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Appendix

35. (Amended) A scanning exposure apparatus for projecting a pattern image of a mask onto a sensitive plate through a projection system having a predetermined magnification ratio in a scanning manner, the apparatus comprising:

(a) a scanning system [, kinetically connected to the mask and the plate,] which has a first driving system to move the mask and a second driving system to move the plate and which synchronously scans the mask and the plate with respect to a projection field of said projection system at a velocity ratio corresponding to said magnification ratio during a scanning exposure;

(b) a finely movable stage, [kinetically] connected to said scanning system, which [finely] moves the mask relative to said scanning system;

(c) a detector which detects a positional deviation amount between the mask and the plate during the scanning exposure; and

(d) a control system, connected to said finely movable stage and said detector, which drives said finely movable stage based on said detected deviation amount during the scanning exposure.

36. (Twice amended) A scanning exposure method in which a pattern of a mask is transferred onto a sensitive

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plate through a projection system in a scanning manner, the method comprising [the steps of]:

(a) irradiating the mask with a radiation in order to project an image of said pattern of the mask onto the plate through said projection system;

(b) synchronously scanning each of the mask and the plate relative to said projection system by using a scanning mechanism for a scanning exposure wherein a scanning velocity of the mask is different from a scanning velocity of the plate;

(c) detecting a positional deviation amount between the mask and the plate at a term of the scanning exposure by using a first interferometer to measure positional information of the mask and a second interferometer to measure positional information of the plate; and

(d) correcting a position of the mask determined by said scanning mechanism for decreasing said detected deviation at the term of the scanning exposure.

37. (Amended) A scanning exposure apparatus in which a first object is moved in a first direction and a second object is moved in a second direction for a scanning exposure, the apparatus comprising:

a projection system for the scanning exposure, which is disposed in [between the first object and the second object] an optical path of an exposure beam, the first object being provided on one side of the projection system and the second

object being provided on the other side of the projection system;

a first driving system which moves the first object in the first direction, at least a part of the first driving system being on the one side of the projection system;

a second driving system which [finely] moves the first object in a plane substantially parallel to the surface of the first object while the first object is moved by the first driving system, at least a part of the second driving system being on the one side of the projection system; and

a third driving system which moves the second object in the second direction, at least a part of the third driving system being on the other side of the projection system.

39. (Amended) An apparatus according to claim [37] 38, wherein said second driving system rotates said first object.

42. (Amended) An apparatus according to claim [37] 41, wherein said third driving system includes a linear motor.

48. (Amended) An apparatus according to claim 37, further comprising:

a first [supporting] movable member which is movable in the first direction; and

a second [supporting] movable member which is movable relative to the first [supporting] movable member and which supports the first object,

wherein the first object is moved in the first direction by moving the first [supporting] movable member with the first driving system, and the first object is [finely] moved by moving the second [supporting] movable member with the second driving system, relative to the first [supporting] movable member.

49. (Amended) An apparatus according to claim 48, wherein at least a part of said second driving system is provided [at] on said first [supporting] movable member.

50. (Amended) An apparatus according to claim 48, further comprising:

a reflective surface disposed on the second [supporting] movable member; and

an interferometer, optically connected to the reflective surface, which is used for detecting positional information of the first object.

51. (Amended) An apparatus according to claim 48, wherein the second driving system [finely] moves the second [supporting] movable member without a weight of the first [supporting] movable member.

52. (Amended) An apparatus according to claim 37, wherein [an] the exposure beam irradiated onto said first object defines a rectangular illumination area on said first object, said first direction and said second direction are parallel and reverse to one another, said projection system has a reduction magnification, and a scanning speed of said first object is different from a scanning speed of said second object.

54. (Amended) An apparatus according to claim 38, wherein said second driving system moves [said first object finely] said mask before the pattern area of said mask begins to be illuminated with [an] the exposure beam.

68. (Amended) A scanning exposure method in which a first object is moved in a first direction and a second object is moved in a second direction for a scanning exposure, the method comprising:

moving a first object in the first direction by using a first driving system;

[finely] shifting the first object in a plane substantially parallel to a surface of the first object by using a second driving system while the first object is moved by the first driving system; and

moving a second object in the second direction by using a third driving system.

70. (Amended) A method according to claim [68] 69, wherein said second driving system rotates said first object.

73. (Amended) A method according to claim [68] 72, wherein said third driving system includes a linear motor.

79. (Amended) A method according to claim 68, wherein the first driving system moves a first [supporting] movable member in the first direction; and

the second driving system [finely] shifts a second [supporting] movable member, which supports the first object, relative to the first [supporting] movable member,

wherein the first object is moved in the first direction by moving the first [supporting] movable member with the first driving system and is [finely] shifted by moving the second [supporting] movable member with the second driving system.

80. (Amended) A method according to claim 79, wherein at least a part of said second driving system is provided [at] on said first [supporting] movable member.

81. (Amended) A method according to claim 79, wherein the second driving system [finely] shifts the [second supporting member] first object without a weight of the first [supporting] movable member.

82. (Amended) A method according to claim 68, wherein an exposure beam irradiated onto said first object defines a rectangular illumination area on said first object, said first direction and said second direction are parallel and reverse to one another, a projection system for the scanning exposure has a reduction magnification, and a scanning speed of said first object is different from a scanning speed of said second object.

83. (Amended) A method according to claim 69, wherein said second driving system shifts [said first object finely] said mask before the pattern area of said mask begins to be illuminated with an exposure beam.

96. (Twice Amended) A method of manufacturing a circuitry element [produced] with use of the method as defined in claim 68.

97. (Amended) A method for making a scanning exposure apparatus in which a first object is moved in a first direction and a second object is moved in a second direction for a scanning exposure, the method comprising:

providing a projection system for the scanning exposure, which is disposed [between the first object and the second object] in an optical path of an exposure beam, the first object being provided on one side of the

projection system and the second object being provided on the other side of the projection system;

providing a first driving system which moves the first object in the first direction, at least a part of the first driving system being on one side of the projection system;

providing a second driving system which [finely] moves the first object in a plane substantially parallel to a surface of the first object while the first object is moved by the first driving system, at least a part of the second driving system being on the one side of the projection system; and

providing a third driving system which moves the second object in the second direction, at least a part of the third driving system being on the other side of the projection system.

99. (Amended) A method according to claim [97] 98, wherein said second driving system rotates said first object.

102. (Amended) A method according to claim [97] 101, wherein said third driving system includes a linear motor.

108. (Amended) A method according to claim 97, further comprising:

providing a first [supporting] movable member which is movable in the first direction; and

providing a second [supporting] movable member which is movable relative to the first [supporting] movable member and which supports the first object,

wherein the first object is moved in the first direction by moving the first [supporting] movable member with the first driving system and is [finely] moved relative to the first [supporting] movable member by moving the second [supporting] movable member with the second driving system.

109. (Amended) A method according to claim 108, wherein at least a part of said second driving system is provided [at] on said first [supporting] movable member.

110. (Amended) A method according to claim 108, further comprising:

providing a reflective surface disposed on the second [supporting] movable member; and

providing an interferometer, optically connected to the reflective surface, which is used for detecting positional information of the first object.

111. (Amended) A method according to claim 108, wherein the second driving system [finely] moves the second [supporting] movable member without a weight of the first [supporting] movable member.

112. (Amended) A method according to claim 97, wherein [an] the exposure beam irradiated onto said first object defines a rectangular illumination area on said first object, said first direction and said second direction are parallel and reverse to one another, said projection system has a reduction magnification, and a scanning speed of said first object is different from a scanning speed of said second object.

114. (Amended) A method according to claim 98, wherein said second driving system moves [said first object finely] said mask before the pattern area of said mask begins to be illuminated with [an] the exposure beam.

128. (Twice amended) A method of manufacturing a circuitry element [produced by a] with use of a scanning exposure apparatus made by the method as defined in claim 97.

129. (Amended) An apparatus according to claim 39, wherein during movement of said [first object] mask by said first driving system, said second driving system rotates said [first object] mask about a rotation axis passing through a predetermined point in an illumination region of said exposure beam irradiated to said [first object] mask.

132. (Amended) An apparatus according to claim 37, further comprising:

a fourth driving system which moves said second object in a plane which is substantially parallel to a surface of the second object and in a direction crossing said second direction, at least a part of the fourth driving system being disposed on the other side of the projection system.

133. (Amended) [An apparatus] A method according to claim 70, wherein during movement of said [first object] mask by said first driving system, said second driving system rotates said [first object] mask about a rotation axis passing through a predetermined point in an illumination region of an exposure beam irradiated to said [first object] mask.

135. (Amended) A method according to claim 68, wherein during movement of said first object by said first driving system at least a portion of said second driving system moves in said first direction in order to [move] shift said first object.

139. (Amended) A method according to claim 99, wherein during movement of said [first object] mask by said first driving system, said second driving system rotates said [first object] mask about a rotation axis passing

through a predetermined point in an illumination region of said exposure beam irradiated onto said [first object] mask.

140. (Amended) A method according to claim 97, further comprising:

providing a fourth driving system which moves said second object in a plane which is substantially parallel to a surface of the second object and in a direction which crosses said second direction, at least a part of the fourth driving system being disposed on the other side of the projection system.

141. [An apparatus] A method according to claim [118, wherein

said first measuring device includes a first interferometer system, and

said second measuring device includes a second interferometer system] 97, further comprising:

providing a first interferometer system which detects positional information of the first object; and

providing a second interferometer system which detects positional information of the second object.

142. (Amended) [An apparatus] A method according to claim [140] 141, wherein

said first interferometer system, has a measuring axis for measuring the position of said first object in said

first direction, a measuring axis for measuring the position of said first object in a direction which crosses said first direction and a measuring axis for measuring information on rotation of said first object, and

said second interferometer system has a measuring axis for measuring the position of said second object in said second direction, a measuring axis for measuring the position of said second object in a direction which crosses said second direction and a measuring axis for measuring information on rotation of said second object.

179. (Amended) A scanning type exposure apparatus in which in synchronism with moving a first object in a predetermined direction relative to an exposure beam, a second object is moved, thereby exposing sequentially each of a plurality of defined regions on said second object, comprising:

a projection system which is disposed in an optical path of an exposure beam, said first object being provided on an object side of the projection system;

a movable body which holds said first object and is movable in said predetermined direction, at least a part of the movable body being disposed on the object side of the projection system; and

a first interferometer system optically connected to said movable body, which has a measurement axis passing through a substantial center of an irradiation region of

said exposure beam and which measures positional information of said movable body relating to a direction intersecting with said predetermined direction.

180. (Amended) An apparatus according to Claim 179, further comprising:

a second interferometer system, optically connected [for measuring] to said movable body, which measures positional information of said movable body relating to said predetermined direction.

183. (Amended) A scanning type exposure apparatus in which in synchronism with moving a first object in a predetermined direction relative to an exposure beam, a second object is moved, thereby exposing sequentially each of a plurality of defined regions on said second object, comprising:

a projection system which is disposed in an optical path of an exposure beam, said first object being provided on an object side of the projection system;

a movable body which holds said first object, at least a part of the movable body being disposed on the object side of the projection system;

a first interferometer system, optically connected to said movable body, which has a plurality of measurement axes for detecting positional information of said movable body relating to said predetermined direction; and

a plurality of reflection [surface] surfaces disposed separately on said movable body in correspondence with said plurality of the measurement axes.

184. (Amended) An apparatus according to Claim 183, further comprising:

a second interferometer system, optically connected to said movable body, which has a measurement axis and measures [having a measurement axis for detecting] positional information of said movable body with respect to a direction intersecting with said predetermined direction; and

a reflection surface disposed on said movable body for said second interferometer system and extended substantially in parallel with said predetermined direction.

187. (Amended) A scanning type exposure apparatus in which in synchronism with moving a first object in a first direction, a second object is moved in a second direction, thereby exposing sequentially each of a plurality of defined regions on said second object, comprising:

a projection optical system which is disposed in an optical path of an exposure beam, said first object being provided on one side of the projection optical system, said second object being provided on the other side of the projection optical system, and an image of a pattern formed on said first object being projected onto said second object by the projection optical system;

a first movable stage [holding] which holds said first object, at least a part of the first movable stage being disposed on the one side of the projection optical system;

a second movable stage [holding] which holds said second object, at least a part of the second movable stage being disposed on the other side of the projection optical system;

a first interferometer system [outputting] which outputs positional information of said first movable stage, the first interferometer system being optically connected to said first movable stage;

a second interferometer system [outputting] which outputs positional information of said second movable stage, the second interferometer system being optically connected to said second movable stage;

a first drive mechanism, functionally connected to the first movable stage, which moves [for moving] said first movable stage in said first direction;

a second drive mechanism, functionally connected to the second stage, which moves [for moving] said second movable stage in said second direction; and

[a projection optical system for projecting an image of a pattern on said first object onto said second object; and]

a controller functionally connected to said first interferometer system, said second interferometer system, said first drive mechanism and said second drive mechanism, which converts positional information in said second

direction of said second movable stage outputted from said second interferometer system to first speed information and speed controls said second drive mechanism so that said first speed information may correspond to a constant speed V, and which converts positional information in said first direction of said first movable stage outputted from said first interferometer system to second speed information and speed controls said first drive mechanism so that [the last mentioned] said second speed information may correspond to a constant speed V/β, where β is a projection magnification of the image of the pattern on said first object projected by said projection optical system.